

ARTICLE



Effects of virtual exchanges on learners' affective and speaking outcomes

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Abstract

Interactive speaking performance—understood as dialogic communication through peer exchanges, discussions, and collaborative dialogues involving real-time negotiation of meaning—together with affective improvement remain pedagogically and technologically challenging in language learning. The current study examines the impact of virtual exchanges (VE) on Japanese high school EFL learners' Willingness to Communicate (WTC), International Posture (IP), and oral proficiency. Three VEs between 36 Japanese and 28 Taiwanese high school students were conducted using Google Meet. Analyses of four sources of data (e.g., an eight-item questionnaire on WTC, a 24-item questionnaire on IP, open-ended reflection responses, and paired face-to-face speaking tests) revealed four benefits: enhancement of WTC, promotion of IP, improvement of speaking proficiency, and development of partner-oriented communication. Participant self-perceptions of VEs correlated with prior enjoyment of English classes through junior high school. Furthermore, reflection text-mining indicated that both proactive and passive groups of Japanese participants developed cross-cultural awareness, with proactive learners reporting a sense of fulfillment and passive learners expressing self-criticism about English communication. These findings indicate that greater frequency and duration of international VEs enhance WTC, IP, and oral proficiency while encouraging proactive behaviors in language learners.

Keywords: virtual exchange; willingness to communicate; international posture; speaking

Language(s) Learned in This Study: English

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Introduction

English as Foreign Language (EFL) students often lack opportunities for real-life language use. Unfavorable class sizes and time constraints can hinder development of authentic communication skills (Richards, 2015) — issues likely prevalent in EFL contexts worldwide (Duong & Nguyen, 2018). The current study connects Japanese and Taiwanese high school students via video conferencing to promote real-life language use and increase authentic communication skills.

Computer Assisted Language Learning (CALL) is well established in language teaching (Stockwell, 2022), with benefits and outcomes for online instruction noted (Gacs et al., 2020). For example, online education can make teaching and learning more flexible and learner-centered (Dhawan, 2020). Zoom, a synchronous online conferencing tool, accommodates easy grouping and facilitates language production, meaning-focused output, and opportunities for participant interaction (Kohnke & Moorehouse, 2020).

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Computer technologies like smartphones positively affect student speaking skills (Sherine et al., 2020), though some feel uncomfortable seeing themselves on screen during webcam-based communication (Smidt et al., 2017). Studies also found that instructor unfamiliarity with online education and advancements in methods and practices can cause stress and anxiety (Zara et al., 2022). Higuchi et al. (2020) reported that Japanese high school students in a Skype-based English-language learning program increased interest in international vocations and foreign affairs, without measurable improvement (via standardized testing) in English communication; perhaps due to lower utilization of the Skype-based program, especially among procrastination-prone learners.

Exploring best practices and empirical evidence, the current study examines whether repeated Virtual Exchanges (VEs) through a synchronous online learning platform positively influence language learners' affective and speaking outcomes. VE, now widely used in place of telecollaboration (O'Dowd, 2018), here denotes a form of collective inquiry (Lewis & O'Dowd, 2016) involving three synchronous interactions between high school participants in Japan and Taiwan. This research attempts to enhance Information and Communication Technology (ICT)-based English classes by evaluating the emotional and communicative effects on Japanese high school students engaged in cross-cultural VEs. "ICT" here indicates the use of Google Meet for virtual communication.

By facilitating real conversations with international peers on relatable topics, the aim is to encourage positive attitudes toward English. VEs in the ICT-based classroom are designed to strengthen Willingness to Communicate (WTC), International Posture (IP), and speaking proficiency. Additionally, repeated VEs help address many issues in the EFL environment, though further research is necessary to apply these findings to differentiated classroom practice.

Literature Review

Affective State

VEs help alleviate speaking anxiety among language students. Introverted learners often lack self-confidence, have poorer language skills and feel nervous, scared, and less engaged when communicating in larger groups (Chew & Ng, 2021). To reduce speaking anxiety, group discussions among students (Woodrow, 2006), interactive communication activities (Mejías, 2014), and successful experiences (Dörnyei, 2001) matter more than facing large audiences. Participation in VEs helps alleviate speaking anxiety among language students.

Communication anxiety reduces learners' WTC, affecting the self-confidence that motivates contact with the L2 community (Clément, 1986). MacIntyre and Charos (1996) identified a strong correlation between L2 WTC, competence, and anxiety, with later research confirming perceived competence and L2 anxiety were strong predictors of L2 WTC (MacIntyre et al., 2001). Communication anxiety, confidence in L2 communication, perceived communicative competence, and IP affect WTC (Yashima, 2002). WTC is strongly associated with motivation to learn and communicate (Yashima et al., 2004) and is primarily influenced by perceptions of L2 communicative competence (Peng & Woodrow, 2010). Sato (2019) found that low confidence in English proficiency reduced WTC, especially among low-intermediate speakers, who were further influenced by limited topic interest, interlocutor-related safety, and a lack of confidence (Sato, 2023).

Yashima (2002) introduced IP to describe Japanese EFL learners' attitudes toward the international community, noting that positive attitudes toward foreign cultures and professions foster higher motivation, proficiency, and WTC. Teimouri (2017) confirmed that higher IP strengthens learners' ideal L2 self, which in turn enhances WTC. Teachers should therefore encourage target language use in real communication with foreign peers, which can promote intercultural tolerance and WTC (Cao & Philip, 2006). The current study examines how repeated VEs with Taiwanese English learners influence Japanese students' WTC and IP.

Information and Communication Technology

Technology provides innovative tools for enhancing English learners' proficiency and motivation (Cahyono et al., 2023; Rafiq & Hashim, 2018). Mofareh (2019) found that technology increased student engagement and interaction compared to traditional instruction. Computer-Mediated Communication (CMC) supports content sharing, meaning negotiation, and learner interaction (Bekar & Christiansen, 2018; Ing et al., 2020), while also providing authentic communication that fosters language proficiency and intercultural competence with international language learners (Lee, 2018).

Synchronous Computer-Mediated Communication (SCMC) promotes interactivity, real-time feedback, and reduced learner isolation (Bayode, 2020). Compared with face-to-face classrooms, where teacher presence can heighten anxiety, learners reported feeling more comfortable online (Behforouz et al., 2022). Such environments have been shown to improve WTC (Freiermuth & Jarrell, 2006), as comfort and anxiety influence WTC (Peng, 2007). Teacher technology policies have been shown to enhance learners' WTC in EFL settings (Amirian et al., 2021). Zhang and Du (2023) found that SCMC-based one-on-one sessions provided learners—especially introverts—with a greater sense of control and preference, contributing to increased WTC. Lee and Lee (2020) further reported that frequent virtual intercultural exchanges were associated with higher WTC, emphasizing the importance of cross-cultural engagement in ICT-based language learning. While Ockert (2015) noted significant improvement in IP when Japanese and Australian students connected via Skype, recent reviews do not provide direct evidence linking digital comfort to WTC. Kirkpatrick et al. (2024) recommend further research on WTC in digital contexts.

Improved speaking fluency through VE has been reported (Saito & Akiyama, 2017), however, effects on accuracy and complexity remain underexplored (Kamiya, 2022). Investigating the impact of VEs on Japanese high school students' communicative ability and affective responses could advance ICT-based L2 instruction within and beyond the classroom. Google Meet, which was available at the high school where the first author was employed during the time of data collection, was used to connect Japanese and Taiwanese high school students and analyze WTC, IP, and speaking ability. Aims were to improve Japanese learners' L2 skills while informing effective implementation of VE lessons across the international language learning community.

Purpose

Previous studies indicate appropriately well-designed SCMC activities, especially those promoting meaningful interaction and engagement, can enhance WTC, IP and speaking skills. Students lacking confidence in their English abilities sometimes communicate more easily in groups, as attention is not solely on them. Therefore, two-way communication activities between Japanese and Taiwanese were held to promote meaning-focused output and a sense of accomplishment.

While research on VEs exist, the impact of periodic VEs on common issues faced by Japanese high school students with speaking English has not been comprehensively explored. This current study addresses the effects VEs have on their communicative ability and affective response through cross-cultural group exchanges and analyzing affective state (WTC, IP) and speaking ability as measured by fluency, complexity, and content. Speaking proficiency was assessed using a speaking test aligned with students' VE experiences.

The following research questions inform the current study:

1. How do VEs with Taiwanese high school students influence Japanese high school students' affective state (WTC, IP)?
2. How do Japanese high school students' perceptions of VEs differ according to attitudes toward regular English classes?
3. Do VEs enhance Japanese high school students' speaking ability in terms of fluency, complexity, and task-relevant content?

Students were divided into two groups between October and December 2023: a treatment group (TG) participating in VEs with Taiwanese students, and a control group (CG), who attended regular textbook lessons with a different teacher. Both groups studied relevant textbook units and engaged in small-group discussions during regular classes. However, the CG did not participate in VEs during the study period. Pre- and post-study data concerning affective states and speaking ability were compared to identify differences between groups. To address ethical concerns regarding unequal VE access, the control group participated in a video call in January 2024, ensuring both groups received comparable intercultural experiences.

Materials and Methods

Participants

Eighty Japanese first-year high school students were recruited. After excluding seven who missed any of the three 40-minute VE sessions, 73 students remained ($n = 36$ in TG, $n = 37$ in CG). Participants were 15-16 years old, with equal numbers of males and females in each group.

English proficiency was assessed in advance for a subset of students using the EIKEN test. Created and administered by the Society for Testing English Proficiency (STEP), EIKEN assesses proficiency across seven levels, from beginner to advanced (Grade 5, 4, 3, Pre-2, 2, Pre-1, and 1), with grades being aligned with the CEFR (EIKEN, 2019; Sato, 2020). In the treatment group, four passed STEP Grade 3, one passed Grade 4, and three passed Grade 5. The remaining 28 had taken Grade 3 but did not pass. In the control group seven passed Grade 3 and five passed Grade 4. The remaining 25 had also taken Grade 3 but did not pass. These distributions suggest that both groups were at a broadly comparable level of English proficiency, approximately aligned with CEFR A1. This equivalence supports the validity of subsequent group comparisons.

A preliminary questionnaire was administered to evaluate participants' attitudes toward and confidence in using English. Responses indicated generally negative experiences and low self-perceived proficiency during junior high school. Results indicated that 75% (TG) and 78% (CG) felt "dislike and reluctance" toward English class, while 78% (TG) and 81% (CG) claimed to "dislike and have difficulty" with English. The treatment group was further re-categorized into two groups based on responses: *the proactive group* ($n = 9$) who "like and actively participate in English classes", and *passive group* ($n = 27$) who reported "disliking English and engaging in class activities with minimal effort or enthusiasm". Participants completed and consented to the use of questionnaire data. The study adhered to confidentiality protocols, and steps were taken to ensure anonymity.

Taiwanese high school students ($M_{\text{age}} = 17$ years; 14 male and 14 female) participated in the exchanges. Recruitment was facilitated through the first author's prior collaboration with their English teacher, who was familiar with VE, as well as similarities in age and minimal time differences. Their teacher administered a separate pre-exchange questionnaire to assess students' backgrounds and experiences, and confirmed they were highly motivated and proficient in English (CEFR B1).

Procedure

Research suggests planning time can enhance L2 oral performance. Mehnert (1998), for example, found that 10 minutes of planning enhanced speaking fluency and complexity. Based on these findings, the present study incorporated a 10-minute pre-task planning phase before each VE session to support Japanese learners of English. From October to December 2023, three 40-minute VE sessions were held, with 10 minutes preparation for Japanese students (50 minutes total). The treatment group was organized into 14 groups, each consisting of two or three Japanese students and two Taiwanese students. Gutiérrez-Santiuste and Ritacco-Real (2023) found that participant homogeneity can support learning objectives by promoting empathy, reducing conflicts, and encouraging communication through shared interests, but may limit intercultural analysis. Therefore, groups were arranged along equal gender ratios. Between the

second and third sessions, a cultural box exchange took place via international mail to share aspects of daily life in both countries, including handwritten notes, snacks, and lucky charms.

Pedagogical Design of Thematic virtual exchange

During VEs, participants communicated using pre-determined themes: self-introductions (Session 1), school introductions (Session 2), and future dreams, occupations, and cultural box exchanges (Session 3). Based on a previous study between Japanese and Chinese students (Kobayashi et al., 2021), themes were selected before VEs commenced. Relevant vocabulary/keywords were provided, which students could reference freely. Since evidence on integrating VEs with content-based language learning are limited (Cunningham, 2019), content-based L2 Instruction (Brinton et al., 1989) was implemented to foster proficiency by discussing relevant topics in English.

Session Highlights and Communication Strategies

After initial hesitation during the first exchange, students introduced themselves and their interests, with some eventually exchanging social networking information. Due to health concerns, participants wore masks, which can impair speech and communication by blocking visual lip cues, limiting articulation, and altering speech features (Palmiero et al., 2016).

The second session focused on school life, consisting of real-time school tours of facilities, classrooms, playgrounds, and cafeterias in Japan and Taiwan. Students utilized language such as, “We eat lunch here.” and “We have physical education on the playground”. When pronunciation was difficult or inaudible, the chat function was used two or three times each 40-minute VE to assist with conversations.

Cultural Exchange and Reflective Practice

The third session began with the cultural box exchange, which provided topics for intercultural discussion (see [Figure 1](#)). Students presented handwritten messages, snacks, and good luck charms (see [Figure 2](#)).

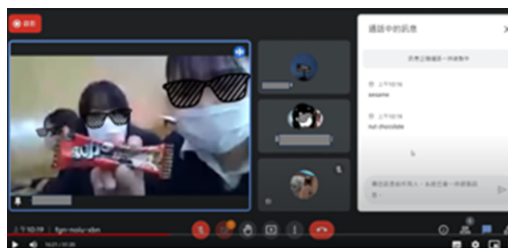
Figure 1

The Third Exchange



Figure 2.

Explaining Gifts



Belz and Thorne (2006) recommend supplementing VEs with reflections on transcripts or recordings.

Following the Knowledge, Awareness, Skills and Attitude (KASA) framework (Freeman, 1989), Japanese participants reflected after the third exchange on topics they wished to discuss in future exchanges and on what they wanted to communicate in English but could not. Written reflections were discussed on-site, allowing participants to share and identify next steps and challenges.

Instruments and Data Analysis

Two questionnaires from Yashima (2009), originally developed and validated for Japanese EFL learners, were administered before (pre-questionnaire) and after (post-questionnaire) VEs to assess participants' affective state. The first ([Appendix A](#)) included eight items (Yashima, 2009) measuring WTC in various English-speaking situations, rated on a six-point scale from "I never talk" (1) to "I always talk" (6). The second ([Appendix B](#)) assessed IP across 28 items (Yashima, 2009) regarding attitudes toward people of other cultures and the international community, with responses rated on a six-point scale from "I strongly disagree" (1) to "I strongly agree" (6). Deemed appropriate for high school students based on prior applications in secondary education (Yashima et al., 2004), both questionnaires were used without modification. Scores for each question were tabulated, and means were calculated. An ANOVA was conducted to determine changes in affective state (WTC, IP) between pre- and post-questionnaires. Given the exploratory nature of the study, statistical significance was evaluated at the .10 alpha level, with $p < .10$ interpreted as marginally significant.

After VEs, participants responded to open-ended questions based on the KASA framework: What did you learn? (Knowledge), what new things did you notice? (Awareness), what can you now do in English? (Skills), and what feelings and attitudes did you have? (Attitude). The K.A.S.A. framework encourages reflection across four dimensions: "knowledge", "awareness", "skills", and "attitude." Although originally developed for teacher education, recent studies have applied it to language learners (Sakurai, 2015; Toyoda, 2016). Simply instructing learners to reflect can be challenging, as it requires introspection and learners may overlook certain aspects. Using the KASA framework facilitates structured reflection. In this study, the framework was adapted to help high school students reflect on their VE experiences.

Qualitative data were analyzed quantitatively using KH Coder 3 to reduce researcher bias (Higuchi, 2020). Text mining methods identified patterns in learner reflections. Correspondence analysis—a multivariate technique—visualized relationships between variables and words. By mapping co-occurrence structures in two-dimensional space, this method revealed characteristic word usage and clustering tendencies among proactive and passive participants, supporting interpretation of learner attitudes toward VEs.

Paired speaking tests were administered to Japanese participants (TG, CG) only before and after VE sessions. On test days, participants received a speaking task card ([Appendix C](#)) containing two tasks, a schedule card ([Appendix D](#)) to complete, and four minutes for spontaneous, unscripted conversation. No preparation time was given, and pairings for both tests were determined arbitrarily by the second author. An assistant in another room timed and recorded conversations with an IC recorder, and audio was used for scoring. Recordings were randomized prior to analysis to ensure participant anonymity and reduce potential rater bias.

Below is an example of a pre-phase speaking test:

A: "Are you free on Saturday morning?"

B: No.

A: Are you free on Sunday evening?"

B: Yes.

A: Do you like Okonomiyaki?"

B: Yes.

A: Let's go.

B: OK.”

And conversely, an example of a post-phase speaking test:

A: We are planning to have a Barbeque party. Are you free on Sunday afternoon?

B: No, I'm sorry I'm busy. I'm going to watch a baseball game. But let's go maybe another time. OK?

A: OK. How about Sunday evening?

B: Good. I'm in. I am free. What do we do?

A: We have a Barbeque party so please join us in the evening.

B: Sounds good. I like Barbeque very much. I will go there after the baseball game.

Speaking tests were analyzed to determine fluency, complexity, and content. For fluency, a holistic 5-point scale (Iino & Yabuta, 2016) was employed ([Appendix E](#)):

5 = Speaks at an appropriate speed with few unnatural fillers, pauses, or corrections; 4 = Occasional unnatural fillers, pauses, and corrections, but speaks at an appropriate speed; 3 = Lots of unnatural fillers, pauses, and corrections, and speaks slowly; 2 = Many unnatural fillers, pauses, and corrections, and speaks very slowly; 1 = Only unnatural fillers, pauses, and corrections, and no coherent speech.

The assistant and second author rated fillers, pauses, repetitions (including corrections), and speech rates accordingly. Raters' Kappa coefficients were compared to assess interrater reliability, after which, averaged scores were analyzed using an ANOVA.

Using the Iino and Yabuta (2016) index, the assistant and the second author calculated the mean number of clauses as a measure of complexity before analyzing with an ANOVA. After confirming interrater reliability via Kappa coefficients, their average scores were used for analysis. Since participants had relatively low proficiency and provided limited spoken discourse, sentences were counted, including subordinate clauses.

Evaluation criteria for content was based on the Curriculum Research Center of the National Institute for Educational Policy Research (2021) and Koizumi (2022) and rated on a 5-point scale ([Appendix F](#)) by the assistant and the second author to obtain the Kappa coefficients, which were subsequently measured using an ANOVA. Content points ([Appendix F](#)) are: Make plans (Condition 1) and discuss what to do (Condition 2) using Appendices [C](#) and [D](#).

Results

Affective State

Questionnaire Results

Psychological scale questionnaires administered to the treatment and control groups before and after VEs were analyzed for changes in affective state (WTC, IP). Internal consistency reliability was high. In the pre-questionnaire, reliability coefficients for WTC items were $\alpha = .82$ (TG) and $\alpha = .80$ (CG), and for IP items were $\alpha = .91$ and $\alpha = .89$, respectively. For the post-questionnaire, WTC reliabilities were $\alpha = .81$ for both groups, and IP reliabilities were $\alpha = .84$ (TG) and $\alpha = .87$ (CG). Items 14, 15, 17, and 18, which had adjusted item-total correlations below .02. and contributed little to reliability, were removed from the IP scale. An ANOVA was performed on the remaining 24 items. Descriptive statistics for affective state are shown in [Table 1](#).

Table 1

Descriptive Statistics of Pre-and Post-Intervention WTC and IP Questionnaire Scores by Group (N = 73)

	Pre-Intervention		Post-Intervention					
	TG (n = 36)	CG (n =37)	TG (n =36)	CG (n =37)	TG (n =36)	CG (n =37)		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
WTC (8)	3.53	0.65	3.54	0.69	4.11	0.79	3.70	0.62
IP (24)	3.20	0.64	3.08	0.70	3.74	0.44	3.20	0.64

Note. WTC = Willingness to Communicate (8 items), rated on a 6-point scale from “I never talk” (1) to “I always talk” (6); IP = International Posture (28 items), rated on a 6-point scale from “I strongly disagree” (1) to “I strongly agree” (6). Scores represent mean values. TG = Treatment Group. CG = Control Group.

Pre- and Post-Intervention WTC Results

WTC was relatively low at pre-intervention with no significant differences between groups. However, the treatment group showed significant improvement, while the control group improved slightly in the post-intervention. An ANOVA with 2 groups (TG, CG) \times 2 time points (with pre-and post-intervention) was performed to examine differences in WTC, with *group* (Factor 1) and *time* (Factor 2) as independent variables and questionnaire scores as the dependent variable. Generalized eta squared (η_G^2) was used to report effect sizes as between-subjects and within-subjects designs are comparable (Bakeman, 2005). Effect sizes were calculated using the following formula according to Olejnik & Algina (2003):

$$\eta_G^2 = x = \frac{SS_{effect}}{\delta \cdot SS_{effect} + \sum SS_{Meas} + \sum SS_K}$$

Results of the ANOVA with *groups* (TG, CG), and *time* (pre, post), showed the main effect of *group* remaining significant, $F(1, 71) = 2.90, p = .093, \eta_G^2 = .023$, while the main effect of *time* was significant, $F(1, 71) = 14.32, p < .001, \eta_G^2 = .077$. Since interactions between *group* and *time* were also significant, $F(1, 71) = 4.81, p = .032, \eta_G^2 = .027$, a simple effects test was performed. Results of the simple effects of the instructional method showed no statistical difference between groups in the pre-intervention, $F(1, 71) = 0.01, p = .913$, though the treatment group had higher WTC after the VE, $F(1, 71) = 7.02, p < .01$. Furthermore, the increase in WTC after the treatment was significant, $F(1, 71) = 16.29, p < .001$ (see [Figure 3](#)).

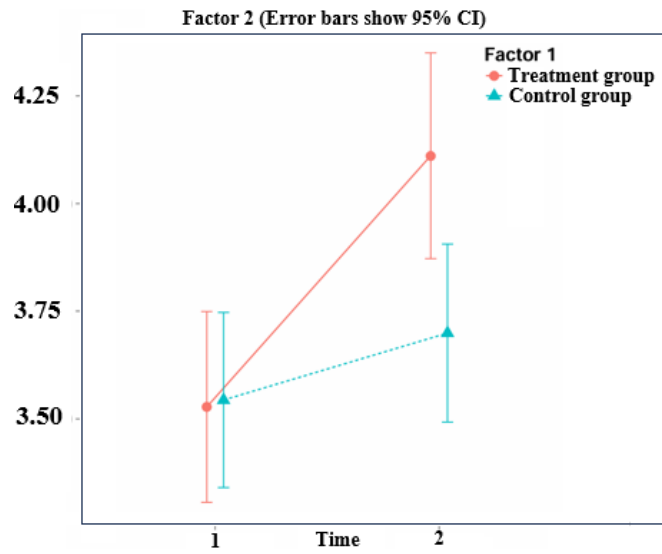
Pre- and Post-Intervention IP Results

Based on the ANOVA, no significant differences between groups appeared at the pre- and post-intervention, though the treatment group showed significant improvement over the control group's slight improvement in the post-intervention. *Group* (factor 1) and *time* (factor 2) were analyzed as independent variables with IP questionnaire scores as the dependent variable.

An ANOVA revealed that the main effect of *group* was significant, $F(1, 71) = 13.22, p < .001, \eta_G^2 = .071$, and the main effect of *time* was significant, $F(1, 71) = 8.85, p = .004, \eta_G^2 = .068$. The interaction between the instructional method and *time* remained in a significant trend, $F(1, 71) = 3.53, p = .064, \eta_G^2 = .028$. Sub-analysis by simple effects test revealed that the simple main effect of *group* showed a significant trend in the post-intervention, $F(1, 71) = 17.84, p < .001$, although no significant difference was identified in the pre-intervention, $F(1, 71) = 0.67, p = .417$. While the control group experienced no significant difference with respect to *time*, $F(1, 71) = 0.50, p = .485$, there was a significant difference in the treatment group, $F(1, 71) = 15.21, p < .001$. Results are shown in [Figure 4](#).

Figure 3

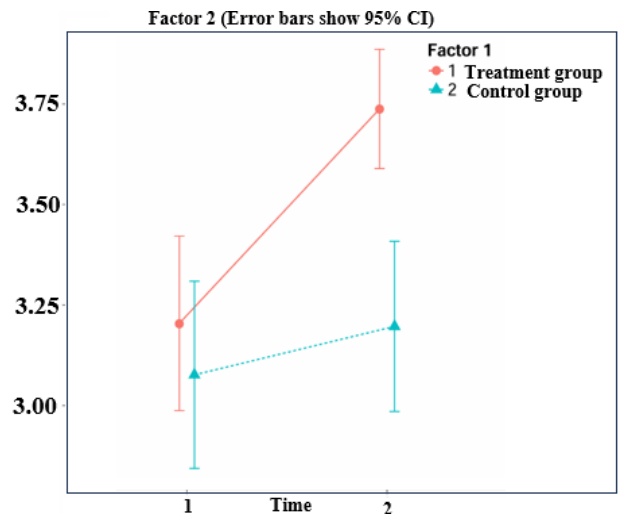
Line Plot of Pre-and Post-Intervention WTC Scores by Group



Note. Error bars are 95% confidence intervals.

Figure 4

Line Plot of Pre-and Post-Intervention IP Scores by Group



KASA Reflection Results

Based Reflections were analyzed using the KASA framework. The treatment group was divided based on pre-intervention responses regarding dispositions toward English: the *proactive group* ($n = 9$) reporting that they “like and actively participate in English classes”, and the *passive group* ($n = 27$) reporting that they “dislike and passively participate in English classes”. Participants responded in Japanese, which were translated into English using DeepL Translator to handle specialized vocabulary and reduce subjective interpretation by the analyst.

In the *proactive group*, 210 of 333 extracted words were analyzed, representing 89 out of 121 unique words. For the *passive group*, 417 words were extracted, with 271 analyzed, representing 127 of 159 unique words collectively. On average, the proactive group used 23 words per person, while the passive group used ten words per person. The *proactive group* used more descriptive and expressive vocabulary, using ten different words compared with five in the *passive group*.

KH Coder 3 was used to remove redundancies such as particles and auxiliary verbs and extract meaningful words from the sample. Only words appearing five or more times were included since the minimum number of participants was nine. The five most frequently used words are shown in [Table 2](#).

Table 2

Top 5 Most Frequent Words in Proactive and Passive Groups

Proactive Group ($n = 9$)		Passive Group ($n = 27$)	
extracted word	number of occurrences	extracted word	number of occurrences
I	30	I	25
be	16	be	22
English	9	Taiwan	9
not	8	School	8
speak	8	Taiwanese	7

Correspondence Analysis Results

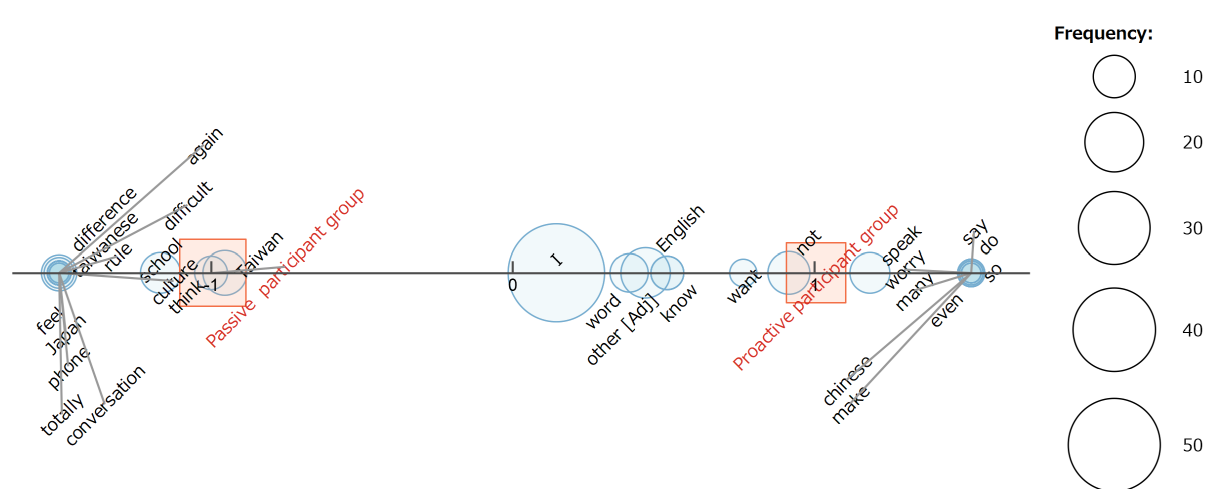
Word frequency and comparable elements such as matching parts of speech and synonyms were analyzed between both sub-groups. The proactive group’s use of “English” and “speak” suggests stronger intentionality with the communicative act. Conversely, the passive group used specific situational details such as “Taiwan” and “Taiwanese”, suggesting they focused more on describing exchanges in a more factual manner. Other situational terms such as “school,” appeared more frequently in the passive group, reinforcing the descriptive nature of their responses. The terms “English” and “speaking” reflect the dynamic act of communicating, while the terms “Taiwan,” “Taiwanese,” and “school” reflect static, contextual content related to location or setting. A correspondence analysis was conducted to analyze similarities and differences between them, with the minimum number of word and document occurrences set to three.

The correspondence analysis (see [Figure 5](#)) features circles indicating extracted words, with size signifying frequency. Squares represent passive and proactive groups (external variables). The further they are plotted from the origin, the more pronounced the bias. Words positioned near a group indicate words used by that group. The proactive group tended to use verbs like “speak”, reflecting outward, communicative engagement, while the passive group was apt to use verbs such as “think”, indicating inward, cognitive processing. These differences suggest not just linguistic variation, but also distinct

levels of participation and interpersonal orientation during the activity. This focus on verb usage highlights how verb choice can reveal learners' cognitive states and social positioning within a communicative context.

Figure 5

Results of Correspondence Analysis



One *proactive* student writes:

I'm still not very good at speaking English or Japanese, but I'm looking forward to the next time I can make a call, and I'd like to visit Taiwan and many other places in the world and talk to many different people.

Compared with a student's response from the *passive* group:

From now on, I think we can look at any news from any other country, regardless of (other than) Taiwan, with a fair eye.

Proactive group responses revealed a positive and motivated attitude. As can be seen from the student's comments above, despite a perceived lack in English skills, *proactive* students maintained optimistic outlooks, expressing a willingness to travel, interact with people of different backgrounds, and continue communicating with others regardless of perceived English deficiencies.

The *passive* group's comments, by contrast, lacked specified feelings, expectations or motivations. While one student claimed a fairer perspective on international news their attitude remained over generalized.

The *passive* group often used "difficult" (see Figure 5) reflecting perceived challenges to speaking in English. Students wrote:

I felt again that it is difficult for others to understand everything in Japanese English or my current English ability.

It was difficult to express my thoughts clearly in English.

I felt nervous because speaking in English is difficult for me.

This pattern is consistent with other characteristic words such as "hard," "not confident," and "couldn't," which typically reflected communicative difficulty. Though both groups expressed difficulty in communicating efficiently, only the *proactive* group conveyed a sense of fulfillment.

Speaking Ability

Pre- and Post-Speaking Test Results

Paired speaking tests were administered before and after VEs to assess changes in participants' (TG, CG) fluency, complexity, and content (see Table 3). Kappa coefficients indicate the degree of agreement between the assistant and second author. Results showed statistically significant levels of agreement (pre-VE: $\kappa = .72, p < .001$; post-VE: $\kappa = .61, p < .001$); therefore, subsequent analyses used the mean scores of the two raters. To reduce bias, recordings were anonymized and randomized so raters could not identify pre- or post-test samples.

Table 3

Descriptive Statistics of Pre and Post Speaking Tests for TG and CG (N = 73)

	Pre-test				Post-test			
	TG (n = 36)		CG (n = 37)		TG (n = 36)		CG (n = 37)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
fluency (5)	3.44	.64	3.43	.68	4.19	.45	3.73	.56
complexity	14.53	3.18	14.62	3.66	17.19	3.88	16.30	4.11
content (5)	3.97	.53	3.93	.49	4.54	.48	4.05	.55

Note. Fluency and content were rated on a 5-point scale. A score of 5 in fluency indicates smooth speech with few unnatural pauses or fillers (Iino & Yabuta, 2016). A score of 5 in content reflects relevant, well-reasoned opinions meeting both evaluation conditions. TG = Treatment Group. CG = Control Group.

Fluency

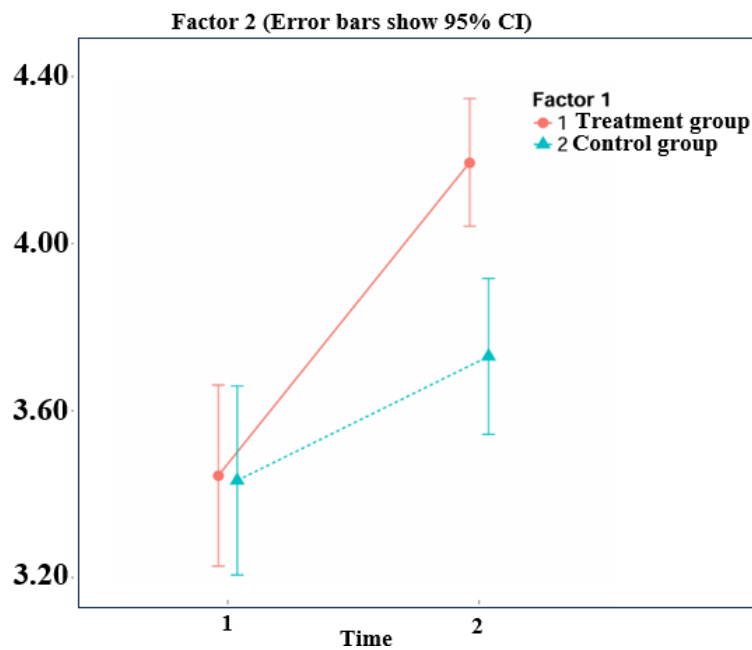
“Fluency” in Table 3 indicates participants speaking slower with frequent corrections at pre-test but speaking with appropriate speed and occasional corrections at the post-test. To verify differences in “fluency”, a two-way ANOVA was conducted, with group (TG, CG) and time (Time 1, Time 2) as independent variables, and speaking tests as dependent variables. Results showed the main effect of group was significant at the 5% level, $F(1, 71) = 4.41, p = .037, \eta_G^2 = .040$ and the main effect of time was significant at the 0.1% level, $F(1, 71) = 44.43, p < .001, \eta_G^2 = .168$. The interaction between group and time was significant at the 1% level, $F(1, 71) = 8.30, p = .005, \eta_G^2 = .036$. Although no significant pre-test differences between groups were identified, $F(1, 71) = 0.01, p = .938$, significant differences were found at post-test, $F(1, 71) = 15.18, p < .001$. These results indicate that both groups scored higher on the post-test; specifically, the treatment group showed a significant increase, $F(1, 71) = 35.89, p < .001$, as did the control group, $F(1, 71) = 9.63, p < .01$. While VEs may have supported gains in “fluency”, the speaking exchange itself—regardless of format—likely contributed substantially. Average pre- and post-test scores are shown in Figure 6.

Complexity

Kappa coefficients were calculated to assess interrater agreement between the assistant and second author regarding participants' complexity scores (i.e., number of clauses) in the speaking tests. Agreement was statistically significant (pre-test: $\kappa = .99, p < .001$; post-test: $\kappa = .99, p < .001$), and subsequent analysis used the mean scores of the two raters.

Figure 6

Line Plot of Pre- and Post-Speaking Test: Fluency Scores by Group



“Complexity” in Table 3 suggests no difference between groups at pre-stage. An ANOVA revealed the main effect of *group* as $F(1, 71) = 0.26, p = .610, \eta_G^2 = .003$, and the main effect of *time* as $F(1, 71) = 32.22, p < .001, \eta_G^2 = .080$, which was significant at the 1% level. Interaction between *group* and *time* was $F(1, 71) = 1.68, p = .199, \eta_G^2 = .004$, suggesting that increases in complexity occurred regardless of participation in VEs and was possibly due to intervention effects such as regular classroom instruction or practice effects from task familiarity. However, a slight difference in post-test averages between groups is shown in Figure 7.

Content

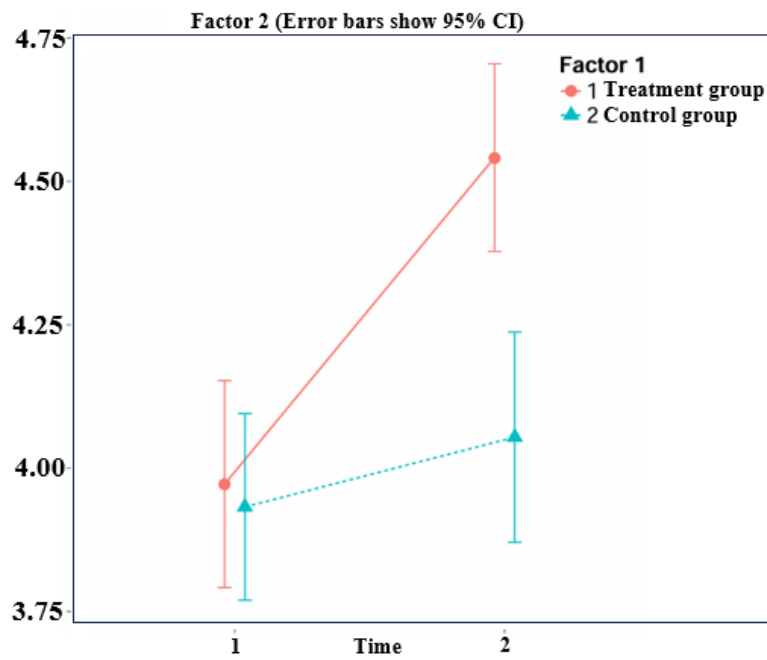
Kappa coefficients were obtained to assess interrater agreement between the assistant and second author, regarding participants’ “content” rating in the speaking tests. Agreement was statistically significant (pre: $k = .78, p < .001$, post: $k = .81, p < .001$), requiring subsequent analysis with the added mean of the two raters.

“Content” results in Table 3 showed no significant differences in the pre-test. While meeting the criteria for “content” evaluation, they do not explain the reason for no significant differences, though the treatment group showed improvement in the post-phase. An ANOVA revealed a significant *group* main effect, $F(1, 71) = 9.36, p = .003, \eta_G^2 = .063$, and a significant main effect of *time*, $F(1, 71) = 16.82, p < .001, \eta_G^2 = .104$. The interaction between *group* and *time* was also significant, $F(1, 71) = 7.06, p = .009, \eta_G^2 = .046$.

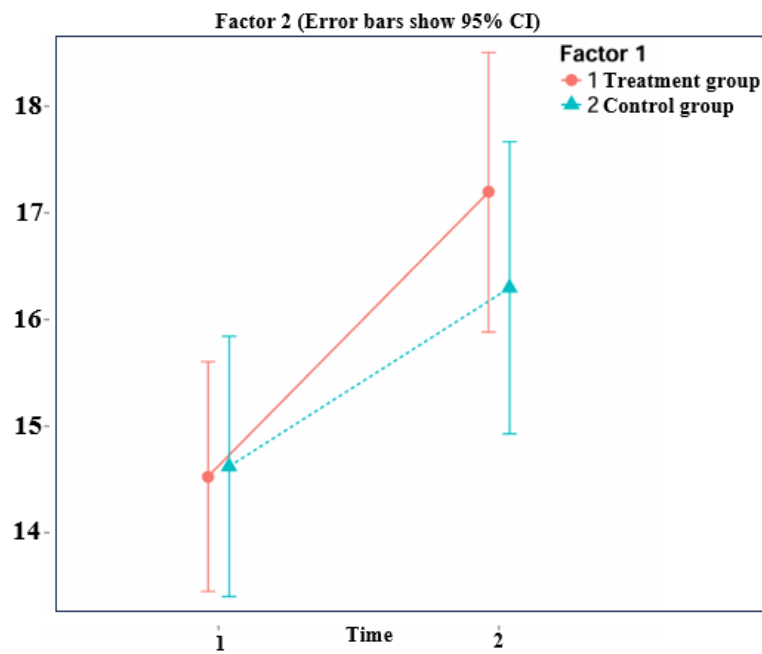
Although no significant differences were identified between groups in the pre-test, $F(1, 71) = 0.11, p = .741$, significant differences were found in the post-test, $F(1, 71) = 16.14, p < .001$. Analyses revealed the content rating in the post test improved for the treatment group $F(1, 71) = 18.51, p < .001$, whereas that of the control group did not, $F(1, 71) = 1.340, p = .254$. This improvement suggests VEs may have contributed to the improved speaking content rating (see Figure 8).

Figure 7

Line Plot of Pre- and Post-Speaking Test: Complexity by Group

**Figure 8**

Line Plot of Pre- and Post-Speaking Test: Content by Group



Discussions

WTC and IP

The psychological scale questionnaire administered to treatment and control groups indicated that VEs were effective, supporting previous findings that communicative experiences and collaborative speaking activities foster positive affective states and reduce speaking anxiety (Dörnyei, 2001; Mejías, 2014; Woodrow, 2006). Although no statistical difference was found in the pre-questionnaire, post-questionnaire results showed significant increases in WTC, suggesting that interaction with international peers through VE can improve learners' attitudes. As Sato (2019) observed, WTC is correlated with confidence, and these findings indicate that VEs increased Japanese learners' confidence. Findings on IP and speaking ability support this, as IP and speaking ability are directly correlated with WTC (Yashima, 2002). This suggests Japanese high school students' affective states were positively impacted through VE.

The psychometric scale questionnaire administered before and after VEs to both groups found that VEs effectively increased IP. Though representing a different demographic of Japanese students, these results confirm Ockert's (2015) research on VEs improving IP and reaffirms Yashima's (2002) findings that IP is correlated with WTC. The current study specifically demonstrates improved IP among Japanese high school English learners.

Reflections Using KASA Regarding Virtual Exchange

Open-ended questionnaires for the *proactive* ($n = 9$) and *passive* ($n = 27$) sub-groups indicated successful experiences (Dörnyei, 2001). Despite differences in perception and motivation within the treatment group, VEs positively impacted affective states. The *proactive* group was more intentional about speaking with counterparts, suggesting ICT can be used to increase opportunities for motivated learners to communicate in English. Although the *passive* group responded less positively, they demonstrated interest in Taiwanese schools and culture, indicating exchanges with foreign peers fostered new cross-cultural awareness. This supports previous findings that interactions with foreign peers provide meaningful opportunities to explore different cultures and develop interests in international vocations and foreign affairs (Higuchi et al., 2020).

Regardless of limited English proficiency, both groups reported positive interaction experiences. Increased motivation to learn English made students more willing to interact, fostering improvements in speaking and communicative skills. This current study suggests earlier VE integration into the EFL curriculum before high school could facilitate more successful learning experiences (Dörnyei, 2001) and alleviate early anxieties about English.

Correspondence analysis revealed that the *proactive* group reported increased awareness of communication and fulfillment in using English, whereas the *passive* group focused more on activity content than on the communicative act, suggesting an emphasis on listening for information. VE activities appear to increase positivity, awareness, and language proficiency, with broader implications that earlier exposure to VE in secondary education may enhance interactive speaking performance and affective states of L2 WTC and IP.

Speaking Test

Speaking tests measured fluency, complexity, and content. Consistent with previous findings (Cahyono et al., 2023; Saito & Akiyama, 2017) results indicated VEs were effective in enhancing fluency. As indicated in the Introduction, EFL environments can limit authentic communication skills due to class size and time constraints (Richards, 2015), however, online interactions can expand opportunities for English communication. Additionally, VE facilitates smaller groups, which may have contributed to increased fluency by reducing anxiety (Behforouz et al., 2022).

Though treatment and control groups improved on the post-speaking test, VEs did not directly affect language complexity. The exchanges emphasized content rather than formal aspects such as expressions

or syntax, suggesting that extra planning may be required to enhance complexity. Since students use relatively shorter expressions in conversation, post-exchange writing instruction or curriculum incorporating English mechanics may be necessary to develop complexity. Recording VE sessions for review and analysis may facilitate noticing (Schmidt, 1993) and promote a focus on form, as students can re-examine complex grammatical and syntactical features (Toyoda & Harrison, 2002).

VE appears effective in sustaining conversation. In the pre-phase, participants struggled to converse for the entire 4-minutes after fulfilling test conditions. In the post-stage, however, students provided more meaningful content, including refusals, and discussed plans for the full four minutes without hesitation.

Since the same participants completed both tests, familiarity with topics may have contributed to post-test improvements. However, the current study finds that students' patterns of growth suggest VEs effectively improve speaking ability, addressing a gap in the literature on post-exchange speech outcomes for Japanese high school students (Kamiya, 2022).

Conclusion

The current study collected data on Japanese high school students' affective states and speaking abilities to inform the development of ICT-based English classes. Using Google Meet, high school students in Japan and Taiwan connected for cross-cultural exchanges. WTC and IP were examined before and after VEs. Significant post-intervention increases indicated improvement in WTC and IP. Open-ended questionnaire responses revealed differences between *proactive* and *passive* groups. The *proactive* group expressed stronger communicative engagement, while the *passive* group focused more on challenges and descriptive content. The findings reaffirm positive impacts VEs have on students' affective states (Yashima, 2002), while advancing understandings of effective language teaching for Japanese high school students.

The current study evaluated fluency, complexity, and content. The treatment group showed significant improvement in the post-test, indicating VEs support fluency. While positive effects on complexity were observed in both groups, these results cannot be attributed solely to VEs. However, content significantly improved in the treatment group. These results suggest VEs can enhance English classes and improve speaking ability. Additional research in this understudied area (Kamiya, 2022) may inform curriculum design and educational planning to foster L2 speaking skills in Japan and beyond.

ICT accommodates cross-cultural VEs, improving WTC and IP. The current study highlights the importance of cross-cultural exchanges and ICT in English language education, suggesting that cross-cultural interactions can strengthen language teaching and support learners' psychological development. WTC and IP may shift as learners from different cultural backgrounds interact. Actively using ICT can increase opportunities for inclusivity and diversity in the learning environment, thereby supporting communication and speaking skills. Future research could further examine how diversity and inclusivity are fostered in the ICT-based English classroom.

While this current study aimed to advance English language teaching through ICT, some limitations should be acknowledged. First, the limited frequency and duration of VEs may have constrained the depth of interaction and outcomes. Second, while broadly controlled through EIKEN scores, most participants had basic English proficiency. Therefore, the effects of VE on higher-proficiency learners remain unknown. Third, curriculum design and institutional planning were not explored in detail, and affective factors related to diversity and inclusivity were not systematically measured. Likewise, learning differences were not addressed, and participant word choices in the qualitative data may reflect familiarity or personality rather than actual feelings. Finally, as research on periodic cross-cultural exchanges continues, cultural and linguistic barriers may hinder communication, highlighting potential opportunities to integrate virtual and augmented reality with VEs to improve the quality of ICT-based instruction.

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Appendix A. Items Used to Explore WTC (YASHIMA, 2009)

This appendix presents eight items regarding participants' Willingness to Communicate (WTC) in various English-speaking situations. Responses were rated on a six-point scale from 1 (I never talk) to 6 (I always talk). The items are intended to reflect participants' willingness to engage in spoken interaction beyond brief greetings, including situations that may involve sustained verbal exchange.

- 1) When you have a chance to make a presentation in front of a large group?
- 2) When you find your acquaintance standing before you in a line?
- 3) When you have a group discussion in an English class?
- 4) When you have a chance to talk in a small group of strangers?
- 5) When you are given a chance to talk freely in an English class?
- 6) When you find your friend standing before you in a line?
- 7) When you have a chance to talk in front of the class in an English class?
- 8) When you have a discussion in a small group of friends?

Appendix B. Items Used to Explore IP (YASHIMA, 2009)

This appendix presents 28 items regarding participants' attitudes toward people of other cultures and the international community. Responses were rated on a six-point scale from 1 (I strongly disagree) to 6 (I strongly agree). The items include both speculative statements (e.g., hypothetical attitudes or intentions) and experiential ones (e.g., past intercultural encounters), in order to reflect a broader range of intercultural perceptions.

*negatively-worded items

Intercultural Approach-Avoidance tendency

- 1) I want to make friends with international students studying in Japan.
- 2)* I try to avoid talking with foreigners if I can.

- 3) I would talk to an international student if there was one at school.
- 4) I wouldn't mind sharing an apartment or room with an international student.
- 5) I want to participate in a volunteer activity to help foreigners living in the surrounding community.
- 6)* I would feel somewhat uncomfortable if a foreigner moved in next door.
- 7) I would be willing to help a foreigner in trouble at a restaurant or train station in Japan.

Interest in International Vocation or Activities

- 8)* I would rather stay in my hometown.
- 9) I want to work in a foreign country.
- 10) I want to work in an international organization such as the United Nations.
- 11) I'm interested in an international career.
- 12)*I don't think what's happening overseas has much to do with my daily life.
- 13)* I'd rather avoid the kind of work that sends me overseas frequently.

Ethnocentrism (Reaction to different customs/ values/ behaviors)

- 14)*I sometimes feel uncomfortable with the words and actions of people from other countries.
- 15) I prefer to associate with people who are more like me than those who have different habits and values.
- 16) I enjoy doing things in cooperation with people who have different customs and values.
- 17) I want to work with people who have similar ideas and values to my own.
- 18)*I don't like people with different customs and values.

Interest in foreign affairs

- 19) I often read and watch news about foreign countries.
- 20) I often talk about situations and events in foreign countries with my family and/or friends.
- 21) I have a strong interest in international affairs.
- 22)* I'm not much interested in overseas news.

Having things to communicate to the world

- 23) I have thoughts that I want to share with people from other parts of the world.
- 24) I have issues to address with people in the world.
- 25) I have ideas about international issues, such as environmental issues and north-south issues.
- 26)*I don't know what to say when I talk to people from around the world.
- 27)*I have no clear opinions about international issues.
- 28) I have many things I would like to discuss with my foreign friends.

Appendix C. Speaking Task Card

MISSION

・それぞれのカードに書いてある予定を確認して、
 次の週末、いつ（条件①）何をするか（条件②）予定を立てましょう。
 > 制限時間は約4分です。
 > Jack先生は会話に加わりません。二人で話し合ってください。

場面設定

・次の週末、みなさんは、土、日、月曜と3日間の連休です。
 そこで、一緒に遊ぶことになり、予定を立てることになりました。
 お互いの予定を合わせて、何をするか話し合しましょう。
 条件① 条件②

Task Directions

Check the schedule on each card and make a plan for when (condition 1) and what (condition 2) you will do on the next weekend.

The time limit is 4 minutes.

Jack, the assistant, will not join the conversation. Please discuss the situation between the two of you.

Scene Setup

Next weekend, you have a 3-day holiday weekend. So, we are going to make plans to hang out.

Let's make plans (condition 1) and discuss what to do (condition 2).

Appendix D. Schedule cards (for Student A and Student B)

	Saturday	Sunday	Monday		Saturday	Sunday	Monday
Morning	Go out to eat okonomiyaki	Hang out at my home	Do my homework	Morning	Practice soccer		Study English
Afternoon		Have a Barbeque		Afternoon	Go out to eat takoyaki	Watch a baseball game	
Evening	Go swimming			Evening	Hang out at Round 1		

Appendix E. Indicators of fluency in holistic evaluation (IINO & YABUTA, 2016)

- 5 不自然なフィラー、ポーズ、修正の数がほとんどなく、適切なスピードで話している
- 4 不自然なフィラー、ポーズ、修正が時々あるが、適切なスピードで話している
- 3 不自然なフィラー、ポーズ、修正が多く、ゆっくりと話している
- 2 不自然なフィラー、ポーズ、修正がとても多く、かなりゆっくりと話している
- 1 不自然なフィラー、ポーズ、修正のみで、まとまった発話がない

Note. In this rubric, the distinction between “lots of unnatural fillers” (Level 3) and “many unnatural fillers” (Level 2) is based on both frequency and impact on fluency. Level 2 indicates a higher density of disfluencies that significantly slow down speech and impair overall fluency. Level 3 refers to frequent disfluencies that intermittently disrupt speech but still allow for relatively smooth communication. * Unnatural fillers and pauses are defined as excessive use of the sounds such as “uh” and “um,” and awkward long silences that disrupt the normal flow of speech.

5 = Speaks at an appropriate speed with few unnatural fillers, pauses, or corrections; 4 = Occasional unnatural fillers, pauses, and corrections, but speaks at an appropriate speed; 3 = Lots of unnatural fillers, pauses, and corrections, and speaks slowly; 2 = Many unnatural fillers, pauses, and corrections, and speaks very slowly; 1 = Only unnatural fillers, pauses, and corrections, and no coherent speech.

Appendix F. Content Point (Condition)

-
- 5 二つの条件を満たしたうえで、意見を論理的に矛盾がなく、より適切な理由とともに述べている
 - 4 二つの条件を満たしたうえで、理由を述べている
 - 3 二つの条件を満たしている
 - 2 条件はどちらか一つだけ満たしている
 - 1 どちらの条件も満たしていない
-

5. Two conditions are met and the opinion is logically consistent and stated with more appropriate reasons; 4. Two conditions are met and reasons are given; 3. Two conditions are met; 2. Only one condition is met; 1. Neither condition is met.

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